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Leaded Gasoline Presents Hazards to Health

LEAD TETRAETHYL ("ethyl") was introduced about 45 years ago as an antiknock additive to gasoline. Shortly thereafter, it was recognized as an industrial health hazard following the deaths of some workmen handling it. Public health officials and the oil refining industry reacted promptly to the occupational problem but left unanswered the question of how lead particles from auto exhausts affect the population

With the increasing demands made by high-performance auto engines, the use of lead in gasoline has increased tremendously. Today, about two pounds of lead per capita are blown into the air of the United States each year. The levels are highest, of course, in such urban centers as Los Angeles.

Lead is well known as a poison. Until lead-based paints were restricted, there were many cases of brain damage to young children who had nibbled the paint from peeling walls and toys. We are, however, in a serious quandary about the hazard from the present levels of lead in the environment.

THE MOST persuasive argument of the oil industry is that no case of lead poisoning can be proven to have resulted from airborne lead originating from auto exhausts. It is generally accepted that lead exhaust could be practically eliminated but only at a probable cost of at least one cent a gallon of gasoline. The prohibition of lead antiknock would, furthermore, discriminate against smaller, less efficient refineries, which would be less able to reconstruct their fuel mix to meet antiknock requirements in other ways.

On the other hand, the feeding of lead to mice and rats in amounts comparable to the present human intake has been found to result in significant shortening of the life span by a general reduction in vigor. Other experiments point to the red blood cells as the principal sufferers from low lead intake; the brain, the kidneys and other organs become involved only with larger doses.

The situation might be summarized by the finding that the blood of apparently healthy individuals contains from 100 to 300 ppb parts per billion) of lead. This is a two- to five-fold increase over the levels that would be expected if the environment were not artificially contaminated.

On the other hand, clear-cut symptoms of lead poisoning have not been reported at less than 800 ppb and 1000 to 1500 ppb are usually required to be acutely dangerous. Yet if blood levels were a direct indicator, they would suggest a safety margin of only two- or three-fold above the present readings.

UNFORTUNATELY, we are quite ignorant of important details about the way that lead is handled by the body. Some individuals may dispose of lead less efficiently than the average or be more sensitive to present levels. In fact, this can be theoretically predicted for certain rather common genetic diseases of the red cells.

For "normal" individuals, we could speculate that 500 ppb in the blood would be safe. Over this level, the kidneys operate to eliminate excess lead in the urine. Thus much more lead would have to be absorbed to drive the content from 500 ppb to toxic levels over 800 ppb.

In any event, however, the proven safety margin is so small that if the procedures routinely applied to new drugs by the Food and Drug Administration were applied to lead tetraethyl, it could hardly be approved unless it carried enormous lifesaving benefits in compensation. Recognizing that environmental contamination by many industrial, agricultural and food chemicals needs to be scrutinized at least as carefully as new drugs, Sen. Gaylord Nelson (D-Wis.) has introduced legislation for the establishment of a Public Health Hazards Commission with broad responsibilities for the oversight of these problems.

We cannot afford to banish every hazard from life by destroying other values. But we can afford even less to permit entrenched habits and economic positions to dominate our policy without the most thoughtful review of the real costs of these innovations, and who is paying for them.

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